

State of Wisconsin

Pedestrian, Bicycle & Pupil Transportation Safety

2004



Program 04-09

PEDESTRIAN, BICYCLE & PUPIL TRANSPORTATION SAFETY

I. GOALS and OBJECTIVES

A. Goals

Goal: To decrease pedestrian crashes to 1,440 and combined fatalities and serious (A) injuries to 350 by 2004; and decrease to 1,200 crashes and 300 K-A injuries by 2007 and to 1,000 crashes and 264 K-A injuries by 2009.

1994 Baseline: 2,059 crashes and 576 pedestrians killed or incapacitated

Goal: To decrease bicyclist crashes to 800 and combined fatalities and serious (A) injuries to 100 by 2004; to 600 crashes and 75 K-A injuries by 2007 and to 400 crashes and 50 K-A injuries by 2009.

1994 Baseline: 1,644 crashes and 285 bicycle riders killed or incapacitated

B. Objectives

Objective 1: To decrease bicycle-motor vehicle crashes to fewer than 1,100 and total bicyclist deaths and incapacitating injuries to 120 for 2004.

Performance Measure: The average of three calendar years of bicycle crashes reported on the state police crash report.

Baseline: In 1994, 1,693 bicyclists were involved in 1,644 reportable crashes. The 1994-1996 average was 1,681.

Status: In 2002, 1,262 bicyclists were involved in 1,162 reportable crashes. The 2000-2002 average was 1,331. In 2002, 9 bicyclists were killed and 147 sustained A injuries.

Objective 2: To decrease pedestrian crashes to 1,600 and total pedestrian deaths and incapacitating injuries to 380 for 2004.

Performance Measure: The numerical average of three calendar years of pedestrians involved in crashes reported on the state police crash report.

Baseline: In 1994, 2,156 pedestrians were involved in 1,939 reportable crashes. The 1994-1996 average was 2,048.

Status: In 2002, 1,797 pedestrians were involved in 1,477 reportable crashes. The 2000-2002 average was 1,560. In 2002, 50 pedestrians were killed and 336 sustained A injuries.

C. Related National/ State Goals

The Center for Disease Control's Healthy People 2010 national public health goals include reducing pedestrian deaths on public roads to 1.0 pedestrian death per 100,000 population and reducing nonfatal pedestrian injuries on public roads to 19 per 100,000 population, and to increase the number of states with law requiring bicycle helmets for bicycle riders.

Federal Highway Administration (FHWA) goals for the year 2008 include doubling bicycle and walking trips from 7.9 to 15.8 and at the same time to decrease bicyclists or pedestrians killed or injured in motor vehicle crashes by 10%. (National Bicycling and Walking Study-1994).

II. ESTIMATED BUDGET

PEDESTRIAN, BICYCLE & SCHOOL BUS SAFETY 09						
Activity	Title	Fed	State	Local	Tot Prog	Loc Benefit
04-09-01	PI&E	80,000	4,000	20,000	104,000	40,000
05-09-02	Training & Technical Assist.	20,000	4,000	20,000	44,000	10,000
04-09-03	Community Programs	124,200	0	100,000	224,200	124,200
04-09-04	Community Surveys	20,000	2,000	5,000	27,000	10,000
402 TOTAL	(PS)	244,200	10,000	145,000	399,200	184,200
State 461	Program Management	0	60,000	0	60,000	0
	0900-36-01 Print Bike Laws	0	32,500	0	32,500	0
State Total	(461)	0	92,500	0	92,500	0
TOTAL	ALL FUNDS	244,200	102,500	145,000	488,700	184,200

III. PROBLEM IDENTIFICATION and PROGRAM JUSTIFICATION

About 12,000 Wisconsin residents walk or bicycle to work and about one million bicycle regularly for recreation. No good estimate of their miles traveled is available.

Although pedestrian and bicycle crashes have decreased dramatically over the past fifteen years, when they do occur most of them result in injury. The difference between a pedestrian or bicyclist death and an injury is minor differences in speed of the motor vehicle, and in the skill, knowledge and attentiveness of drivers, bicycle riders and pedestrians. Only 1.7% of motor vehicle occupants will be seriously injured or killed in a crash, in comparison with 24.4% of pedestrians and 13% of bicyclists, when involved in crashes with motor vehicles.

Although pedestrians and bicycle riders are similar in that they are "low profile" (difficult to see), travel at relatively slow speeds and are relatively unprotected when compared with motor vehicles and their occupants, and although both tend to be injured even in slow-speed crashes with motor vehicles, they pose different problems for the safety professions. They have different risk factors and at-risk groups, and respond to different strategies and motivators.

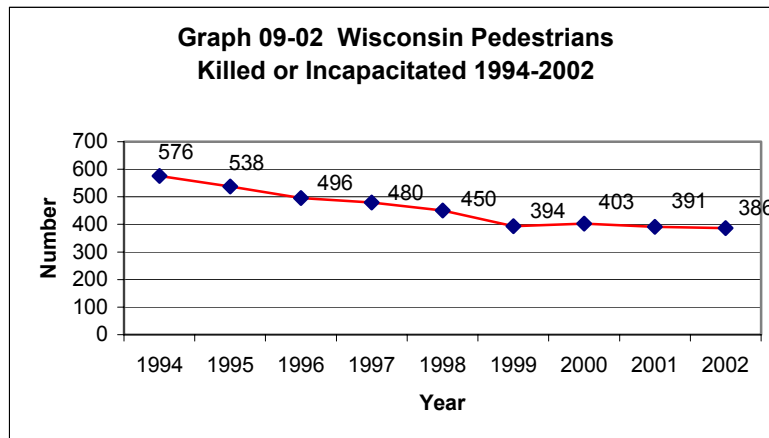
However, for both groups, engineering a friendlier environment for them, and motivating the motoring public to recognize them as valid forms of transportation with legal rights to travel on the pavement, are effective safety strategies. The Federal Highway Administration's goals above highlight the added benefit that, with more pedestrian and bicycle-friendly communities, more exercise will occur and the general well-being and health of the public will improve.

A. Magnitude and Severity of the Pedestrian Crash Problem

Table 09-01 -- WISCONSIN PEDESTRIAN CRASH DATA 1994-2002											
PEDESTRIAN CRASH EFFECTS	1994	1995	1996	1997	1998	1999	2000	2001	2002	94--96 3-yr av	00-02 3-yr av
Pedestrian Crashes	2,059	1,939	1,843	1,807	1,778	1,675	1,658	1,547	1,477	1,947	1,560
Pedestrians Killed	50	64	54	62	64	55	51	42	50	56	47
Pedestrians Injured	2,044	1,897	1,815	1,825	1,764	1,653	1,648	1,545	1,461	1,919	1,551
Pedestrian A-Injuries	526	474	422	418	386	339	353	349	336	474	346
Total K&A	576	538	496	480	450	394	403	391	386	530	393

Source: WisDOT Crash Database

In a 2002 telephone survey of 750 licensed drivers randomly distributed around the state, the majority of respondents appeared to be knowledgeable about the laws requiring them to yield to pedestrians, and most said that they would not enter a crosswalk when a pedestrian was crossing. This self-reported behavior differs from anecdotal information indicating that driver behavior toward pedestrians is relatively bad in Wisconsin. Pedestrians need to be vigilant, whether or not they are in marked crosswalks, and, from our crash statistics, it appears that they are.



Pedestrian crashes have decreased by 28% and pedestrian deaths and incapacitating injuries have decreased by 33% since 1994. It is unknown to what extent this reflects the great decrease in walking that has occurred over the past quarter century or the improved trauma care in cities where the majority of pedestrian crashes occur.

The Wisconsin CODES Project linked 1999 hospital records to crashes with 1,831 vehicles having 2,123 occupants involved in 1,369 crashes involving pedestrians. Of these 14 were seriously injured, 12 were EMS transported and 2 were hospitalized for a total of 8 days and \$27,773 in inpatient charges. No pedestrian deaths appeared in the linked data. In 1998, hospital e-code information for pedestrian injuries showed 446 persons injured, with an average hospital stay of 8.7 days and total in-patient charges of \$11,172,447.

B. Risk Factors for Pedestrian Crash Involvement and Injury:

Location

Location can be urban or rural, can vary by speed limit and the density and type of traffic, and especially by the roadway design. Age and location are correlating factors. Pedestrian-friendly intersections, traffic calming features, and the availability of paved shoulders and sidewalks make walking safe and more enjoyable for all ages. Some examples are:

--Neighborhoods: Child pedestrian crashes generally occur on neighborhood streets and often at mid-block. Children are often struck by a vehicle belonging to their own or another parent or teacher's car at or near school or home.

--Dense Urban Traffic: Milwaukee accounts for about half of all pedestrian and school bus crashes each year. Southeastern Wisconsin has about 45% of the state's population and the highest population densities. Most of the decrease in pedestrian crashes and school bus crashes are accounted for in reductions in the Milwaukee area.

--Intersections: For older youth and adults, being a pedestrian is often a form of exercise as well as transportation and fun. Crashes are often on larger city streets or country roads and are caused by a left turning motorist who does not look for/see the smaller road user or does not judge the pedestrian's movements and speed accurately. Sometimes crashes are caused by a right turning motorist who does not look to the right for pedestrians before turning at a right-turn-on-red intersection. Looking only for cars and trucks at intersections, not smaller vehicles and pedestrians or animals, is a common motorist mistake.

--High-speed Roadways: A few of the fatalities and serious injuries each year happen to motorists who become pedestrians in areas where pedestrians are not expected. Examples are: running out of gas, changing a tire or inspecting/repairing a vehicle problem, or leaving a car with an abusive driver or passenger. The only defense is making oneself as visible as possible with flares, flashlight, another vehicle's lights, vehicle hazard lights, strap-on lighting or retro-reflective outer clothing, and walking facing traffic or even off the roadway altogether when traffic speed is high. Other high-risk locations are on RR ROW, in highway work zones, in stalled cars on roadways and on college campuses.

Table 09-03 CODES Linked Data 2000 Posted Speed Limit, Pedestrian Injury and Cost				
Speed	# Injured	# Hospitalized	# Died	Charges
5-20	102	11	0	\$311,001
21-25	833	111	13	\$2,208,101
26-34	445	103	14	\$2,375,463
35-50	172	35	12	\$1,324,703
51+	93	25	24	\$681,825
Total	1,645	285	63	\$681.825

Source: WI CODES Project

Age

Historically, children, elderly and alcohol-impaired pedestrians constituted about 30% each of pedestrian fatalities. In most recent years, child and elderly pedestrian fatalities are decreasing. Anecdotal information indicates that this may be due to decreased walking because of fear of traffic by these two groups rather than any real improvements in safety. The following table shows that both in incidence of death and injury and in the injury-to-death ratios, it is the adult and elderly population that merits more attention and intervention.

Table 09-04: WI Pedestrian Deaths and Injuries By Age - 2002				
Age	Killed	Injured	% Total	Injury/Death Ratio
Unknown	1	12		
1-14	7	399	26.4	57 to 1
15-24	7	341	22.6	48.7 to 1

25-54	20	522	34.5	26.1 to 1
55+	15	187	12.4	12.5 to 1
Total	50	1,461		29.2 to 1
Source: 2002 Crash Database				

Children are involved in crashes caused most often by dart-out into traffic, excessive vehicular speeds for neighborhoods and school zones, and inattentiveness of motorists. The youngest children may not yet know traffic rules, or quickly forget them when excited about something else in their world. They have less developed sensory abilities; for instance, they hear a horn but cannot tell the direction the sound comes from, and they have only 1/3 the peripheral vision adults have, so do not see traffic as soon as adults would.

A growing number of non-impaired adults who are working, standing or walking along higher speed roadways are killed each year, even though non-impaired adults in middle years (ages 15-55) appear either to move faster and avoid contact with motor vehicle or have more resistance and survivability for injuries incurred when struck.

Gender

Nationally, more than two-thirds of pedestrian fatalities are males, and males sustain more than twice the number of injuries in pedestrian crashes.

Time of Day

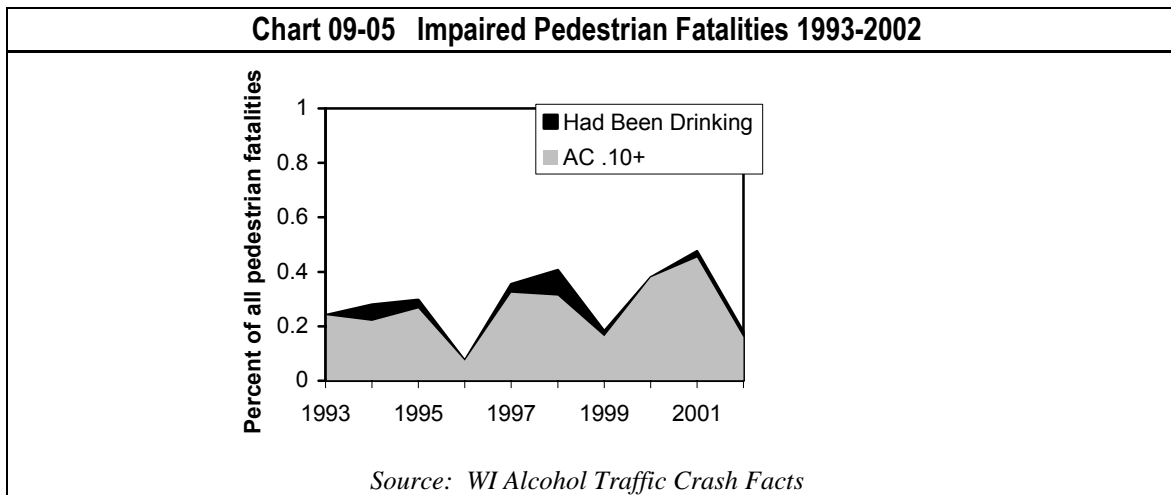
Age and time of day are correlating factors. The large majority of childhood crashes happen in the 3-4 hours right after school in daylight. Three of the five fatalities of those 65 or older occurred during daylight. On the other hand, 28 of the 33 fatalities of adults 15 to 65 years old occurred at night. Dark clothing, especially red and black, make night-time pedestrians almost invisible to motorists.

Almost all of adult pedestrian fatalities occurred at night. National studies use night-time as a surrogate for drinking, which in the case of pedestrians, is a combination of the drinking behaviors and risk-taking of both drivers and pedestrians.

Impaired judgment

Adult pedestrians often cross against lights, cross outside crossing zones at intersections, or cross at the most convenient place for them. These can be dangerous situations but if the teen or adult accurately judges traffic and other environmental conditions a crash rarely occurs.

Introduce alcohol or drug use, and the most athletic pedestrian may have trouble coordinating the walk along or crossing of a street/road. The impaired judgment and reflexes that make a person a dangerous motorist also make him or her a hazard to himself and others when on foot. Over the past several years, between 32 and 50% of Wisconsin's pedestrian fatalities would have been too drunk to have driven a motor vehicle legally. In 2001, 45% of all pedestrian fatalities had an alcohol concentration of 0.10 % AC or higher. The unanswered question is whether they are walking because they have lost their drivers license, because they do not want an OWI ticket or are they walking because they prefer to do so, but are being hit more often because of increased vehicle speeds resulting in less margin for error.



CODES linked data for the year 2000 identified 2,222 pedestrian crashes, in which 262 involved alcohol use by the driver, pedestrian or both. In these 262 crashes, 8 persons died at the scene, 17 were transported to the hospital but died and 54 were hospitalized. Total hospital charges for these crashes were \$1,752,376.

Vehicle type

Few pedestrian crashes result in damage only to clothing or other property; almost all result in some injury to the pedestrian. Speed and the size and construction of vehicle hitting pedestrian affect degree of injury. Bumper height, for example, can mean the difference between injury and death.

Driver Aggression

Driver aggression toward the relatively slower-moving pedestrian is getting worse. Crossing guards are sworn at, given hand signals, and being intentionally driven at, and their directions to traffic disregarded. Crossing guards, like school bus drivers, can take a vehicle license and report it to local law enforcement to initiate a contact and possible citation. However, most are in shock when they or the children are in jeopardy and cannot record this information. Several crossing guards in the Fox Valley/Green Bay area have been struck by motor vehicles in recent years. Violations of pedestrian safety on sidewalks, in driveways and in both marked and unmarked crosswalks should receive attention whether the violator is bicyclist or motorist.

IV. STRATEGIES FOR DECREASING PEDESTRIAN DEATHS & INJURIES

Everyone is a pedestrian at some time, and thus we think of walking as a simple activity. We fail to recognize the complexity of many of the issues facing planners who want to integrate safe pedestrian travel into their transportation and land use plans. Also, pedestrian travel is not as engaging in terms of political motivation as bicycling. The federal government developed the Pedestrian Road Show as a community-focused interactive means of providing a fresh view of the problems and possible solutions for such planning.

A. Strategies Selected for 2004

Pedestrian Safety

Research/data compiled over the last 30 years demonstrates the effectiveness of the following strategies to prevent serious injuries and deaths involving a pedestrian:

Coordination

State Coordination: Wisconsin Walks is the first statewide pedestrian advocacy organization in the nation, and it is a member of the national pedestrian advocacy organization. WisDOT staff serve as ex officio board members. The organization has representatives from health professions, local planners/ engineers/ elected officials, educators, people with a variety of disabilities, communities that have hosted Pedestrian Road Shows/Walking Workshops, and others interested. Wisconsin Walks organized as a 501(c) (3) non-profit on October 2, 2002. BOTS supports some outreach efforts of this organization including Internet page development and maintenance, and some coordination costs. The second board meeting was held in conjunction with Active Living Institute's Conference focused on health professions; others were encouraged to attend. Wisconsin Walks is working with the National Pedestrian and Bicycle Clearinghouse to provide funding for additional "healthy communities" training and motivation events in Wisconsin.

Community Coordination: Strategies to intervene before the crash to prevent/reduce injury, or to intervene once a crash occurs may include any of the following, separately or in combination--engineering, education, enforcement, emergency medical services, and encouragement. Wisconsin communities are encouraged to use the best resources available and, within their local resources, to work on all strategies to improve the safety of all pedestrians whether they are young and have not learned traffic dangers and rules, older and need more time for crossing, using alcohol or other drugs and unable to make accurate judgment about traffic movement, or any pedestrian walking night or day for enjoyment or transportation.

Community leaders concerned about safety for pedestrians are encouraged to remain open to creative innovative approaches. They may develop new strategies or test best practices from other communities, and through state organizations share what they have learned about making walking both fun and safe. BOTS offers communities the services of trained facilitators for the FHWA "Pedestrian Road Show" program that encourages communities to study their pedestrian environment and identify local strategies to address the problems and challenges they have identified. Good community design, such as the Smart Growth Initiative, is one of the most effective strategies to both encourage walking and make it safer. Incorporating city planners into community pedestrian safety groups is a powerful means of improving safety.

Schools should discourage parent drop-offs and should designate student drop-off points and direct and inform all users of the school area why this should be observed - to protect all children by reducing the most dangerous maneuvers of turning, backing, and walking between vehicles especially in multi-directional traffic.

Strategy – Education

Public information and education must be a component of each pedestrian safety strategy. Up-to-date, targeted, free or free-loan educational materials must be made available to communities,

interest groups and advocacy groups who do not have the resources to research or produce such materials.

Pedestrian safety is an extremely complex issue. Multiple types of education or training are necessary because so many target groups need to learn about safe pedestrian environments and behaviors; these groups include trainers, the various at-risk groups, planners, designers, engineers, community leaders, school systems, and law enforcement officers. Adult peer groups such as AARP and 55-Alive can incorporate more pedestrian-motorist material to explain the changes in abilities and perceptions that occur with age and ways to compensate while maintaining mobility as long as possible. Even for child pedestrian safety, multiple groups need to be made aware of their contribution to the danger to child pedestrians and what they can do to address it in their multiple roles of citizen, parent, safety professional, safety advocate or educator. Public information is an essential part of pedestrian law enforcement; Wisconsin motorists behave as if they are totally unaware of pedestrian legal rights.

Strategy – Enforcement

Law enforcement for pedestrian safety includes enforcing motorist speeds, aggression toward pedestrians, red-light violations, failure to yield in crosswalks and for blind pedestrians at all locations. It also includes limited enforcement of pedestrian behaviors coupled with on-the-spot education of the pedestrians about crossing locations and strategies. These enforcement strategies can reduce up to 90% of crashes.

Strategy - Engineering and Conspicuity Enhancement:

Crash prevention through changing the environment can take the form of re-engineering the roadway to adapt to the needs of pedestrians and to minimize conflicts with motor vehicles.

Smart Growth and residential design standards argue against the target 85th percentile speed of 25-30 mph. The potential for pedestrian fatalities is ten times greater at 31 mph than at 15 mph and the short trips on these residential streets do not justify the minimal travel time savings that the higher speed limits yield. Wide, curvilinear streets now in favor should be replaced with a more connected street network of narrowed streets permitting parallel routes serving all travelers safely at moderate speeds. In addition, curvilinear streets and cul-de-sacs discourage walking because walking distance is increased and they diminish sight distance, making them even more dangerous for pedestrians to cross.

Changing the environment can also take the form of increasing the visibility of walkers, joggers and early morning or late evening delivery people. A simple intervention is to educate them about the value of retro-reflective material on their outerwear, especially on their shoes.

Strategy-Evaluation

BOTS will develop means of performing comparisons of communities who did one or more activity with those taking no pedestrian-specific or traffic calming action.

B. Criteria for Project Selection

Priority for pedestrian safety funding will be given to communities with:

- (1) populations in excess of 10,000;

- (2) unusual exposure factors for pedestrian crashes;
- (3) at least three years of data demonstrating a pedestrian crash problem;
- (4) a high-level of community buy-in demonstrated by project match;
- (5) a plan for coordinated activity employing multiple actors, strategies, and/or fund sources, especially if part of integrated Safe Community/Smart Growth planning;
- (6) an evaluation plan;
- (7) demonstration of good self-sufficiency within 1-3 years, and
- (8) a history of using Highway Safety funds effectively.

Communities with functioning Safe Community Coalitions or Smart Growth or Safety Planning initiatives that have used data to select pedestrian safety as a priority area for community activity will be given preference.

Smaller communities may be eligible for start-up grants if they demonstrate problems of unusual scope or unusual community buy-in, plus unusual effectiveness in past Highway Safety Projects.

Project funding is for one year; communities may extend funding for an activity for no more than 2 additional years, including both planning and implementation phases, and these must be documented in the initial project. Each year's activity will be evaluated, and communities that have not performed the prior year's contract will not be eligible for additional years of funding.

Bicycle Safety

Bicycles are legal vehicles on Wisconsin roads and streets, except for high-speed limited access roads posted as restricting non-motorized users. Bicyclists are subject to the laws of vehicle operation just as motorists are, and motorists are required to pass bicyclists with at least 3 feet of space between them. Sidewalk bicycle riding is prohibited unless the local jurisdiction has passed ordinances permitting it. So bicyclists are required to share the streets with motor vehicles.

The bicycle is essentially a non-polluting means of transportation as well as recreation for children and adults well into old age. Most bicyclists use the bike to get from place to place - children and youth to school and others to work while all people can and many use bicycles for errands, visits, and getting to other activities.

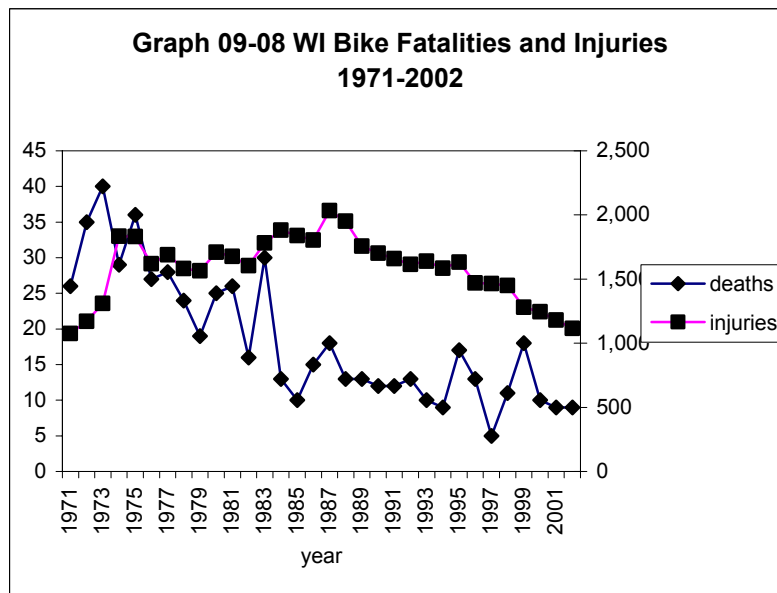
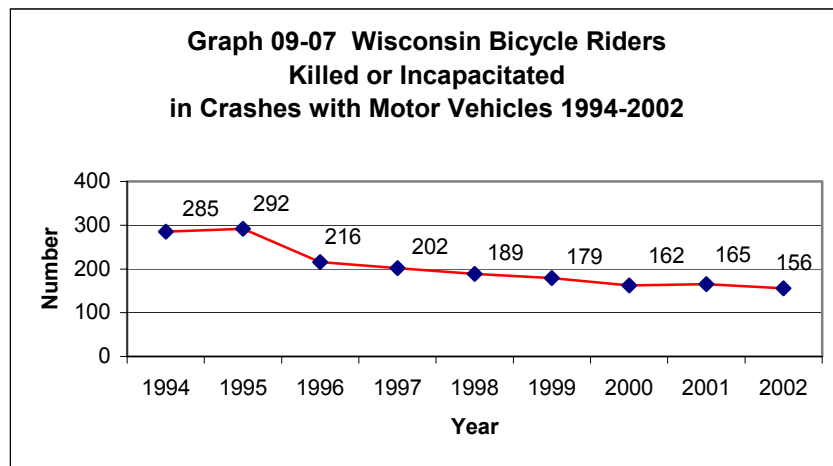
A. Magnitude and Severity of the Bicycle Rider Crash Problem

In the United States, 67 million bicyclists ride approximately 16 billion hours per year. Each year, approximately 700 bicyclists die from injuries due to crashes and more than 500,000 persons are treated in emergency departments. More than 90% of deaths from bicycle-related injuries are caused by collisions with motor vehicles. Bicyclist death rates per trip or per person mile of travel greatly exceed the rates for car occupants. (Harborview Injury Prevention & Research Center 2001.)

Table 09-06 -- WISCONSIN BICYCLE CRASH DATA 1994-2002											
BICYCLE CRASH EFFECTS	1994	1995	1996	1997	1998	1999	2000	2001	2002	94--96 3-yr av	00-02 3-yr av
Bicycle Crashes	1,644	1,714	1,503	1,504	1,500	1,342	1,279	1,216	1,477	1,620	1,209
Bicyclists Killed	9	17	13	5	11	18	10	9	9	13	9
Bicyclists Injured	1,584	1,632	1,469	1,464	1,449	1,279	1,244	1,179	1,115	1,562	1,179
Bicyclist A-Injuries	276	275	203	197	178	161	152	156	147	251	152
Total K + A	285	292	216	202	189	179	162	165	156	264	161

Source: WisDOT Crash Database

These data represent only those bicycle riders involved in a collision with a moving motor vehicle. Emergency Department data indicate that the number of unreported bicycle crashes whether on roadway or in recreational settings is vastly greater than this chart would indicate.



The Wisconsin CODES Project linked 1999 hospital records to 852 bicycle crashes involving 1,069 vehicles with 1,186 occupants (including bicyclists). Of these 6 were seriously injured, 3 were transported and none were hospitalized. No bicyclist deaths were linked. In 1998, hospital e-code information for pedal cyclist injuries showed 124 persons injured, with an average hospital stay of 6.2 days and total in-patient charges of \$1,856,446.

Studies have determined that falls account for over 50% of all bicycle crashes and skills taught and laws enforced can help bicyclists avoid many falls as well as traffic conflicts (J. Kaplan 1975).

B. Risk Factors for Crash Involvement and Injury

Age

Children and youth, especially those 5-9 and 10-14, represent one-third to one-half of fatalities and at least half of injuries in bicycle-motor vehicle crashes, and studies indicate that these children have most often committed the error leading to the crash. Bicyclist death rates per 100,000 population are highest at age 10-14, but 56% of fatally injured bicyclists are age 20 or older.

Adult bicyclist errors account for only 40% of their crashes with motor vehicle crashes. The most common vehicle error causing a crash with a bicycle is motorists' left turns across the path of the bicycle.

Table 09-09 BICYCLE CRASH TYPE BY AGE		
Age	Crash type	Factors
Children 5-9	Driveway ride-out	Perceptual/sensory and judgment skills not developed
Children 11-14	Swerve in front of motorist (not an overtaking motorist error), stop sign violation and driveway ride-out	Not taught to scan over shoulder before changing lanes; follow bad adult models on bike and in vehicle at stop-signs and driveways; still lack visual and judgment skills to evade crashes when in trouble.
College Students 19-25	Same as 11-14 year olds	
Adults 15-64	Left turning motorist most common single crash with motor vehicle, crash types similar to those of motorcyclists	Bicyclists can travel at 20 mph or even faster downhill and have speed-related crashes. Motorists don't judge bicycle speed and distance accurately.
Older Adults 65+	May make same errors as child bicyclist. Same type of crashes as other adults, usually intersection related Sensory and sometimes judgment errors	If new to bicycling or returning after many years of not riding If continuing rider from young adulthood and continuing good health If aging related disabilities occur

Source: NHTSA and Cross & Fisher (1977), as amended by Arthur Ross and JoAnne Pruitt-Thunder

Gender

Death rates for male bicyclists ages 20 to 54 have substantially increased in recent years. Males make more than twice as many bicycle trips as females and their death rate per 100,000 population is six times higher than for females.

Head Injury

Head injury is by far the greatest risk to bicyclists, comprising one-third of emergency department visits, two-thirds of hospital admissions, and three-fourths of deaths. Ninety percent of bicyclists killed in 2000 reportedly weren't wearing helmets.

Time of Day

Night riding without lights, especially on rural high-speed roads is very dangerous. Nationally, one-third of bicyclist fatalities occur on roads with speed limits of 55 mph or higher. A headlight is required by law, even where sidewalk riding is permitted and on all bikeways. A red reflector is required, but a red taillight is recommended.

Driver Impairment or Aggression

Speeding and or alcohol/drug using motorists and motorists who do not know or do not agree that bicyclists have the right to the same roads/streets cut off bicyclists or pass too closely (less than 3 feet) intentionally and even force them off the road. They also fail to yield at crosswalks and intersections, including intersections with bicycle paths that have the right-of-way. CODES linked data for the year 2000 identified 1,425 bicycle crashes, of which 44 involved alcohol use by the driver, bicyclist or both. In these 44 crashes, 1 person was transported to the hospital but died and 14 were hospitalized. Total hospital charges for alcohol-related bicycle crashes were \$136,342. In bicycle crashes in which alcohol was not a factor, 3 persons died at the scene, 9 were transported but died and 113 were hospitalized. Total hospital charges for all bicycle crashes were \$1,810,767 in 2000.

Bicyclist Failure to Observe Traffic Laws

Wrong-way riding is involved in 1/3 of all bicycle crashes. Bicyclists and in-line skaters using the road/street should always travel on the side with other traffic going the same direction. For bicyclists, the most likely citations to reduce crash risks are stop light and stop sign running (children are at high risk, but they follow adult examples), wrong way riding, and mid-block entry (failure to yield). Violations of pedestrian safety on sidewalks, in driveways and in both marked and unmarked crosswalks should receive attention whether the violator is bicyclist or motorist.

IV. STRATEGIES FOR DECREASING DEATHS & INJURIES

A. Strategies Selected for 2002

Strategy - Coordination

State Coordination: Wisconsin has strong state-level coordination of its bicycle safety program. Both a behavioral safety specialist and a bicycle facilities planner are on staff in the Department of Transportation. The Bicycle Federation of Wisconsin is a strong advocate for bicycle riders and its leaders work closely with the state.

Community Coordination: Community coordinated activity to prevent bicycle related injury can gain more results by combining strategies indicated below and focusing on the group(s) of bicyclists and types of motorists in their area. Neither instruction, nor helmet encouragement are enough if parents and community leaders (law enforcement, teachers, city council, etc.) do not insist that good bicycling is practiced and laws are obeyed by both bicyclists and motorists.

Persons who need to be aware of the status of bicycling in their community include parents, teachers and school officials, elected officials, older youth and adult bicyclists, employers and businesses, health care providers, law enforcement officers, bicycle clubs and shops, motorists and pedestrians.

Strategy-Education/Training

Bicycle safety instruction can be made available for both children and adults. Instruction is geared to correcting errors commonly made by children and for adults, giving experience, skills and information to build confidence bicycling in traffic.

- Children can be taught by their parents that certain limits apply and that more independence comes as skills and judgment develop. Two most important rules are 1) wear helmet correctly every time you get on the bicycle, even in the yard or driveway and 2) do not ride the bike out of the driveway without stopping at the end and looking for and waiting for traffic to pass. Parents should not permit young children to ride alone until the parent is confident that all basic skills have been acquired and are being applied by each child in the family. Children develop at different rates, so age is not always a good indicator.
- Basics of Bicycling (BOB) developed by Bicycle Federation of America. Curriculum with all lessons and video with introduction and 2 of the 7 lessons; 5 lessons are on-bike. Design age is 4th grade, useful for grades 3-5 with little or no modification of difficulty level. Written request and commitment to implement must be submitted by School District (1 per district) BOTS purchased curriculum packages, so no cost to educational agency.
- Wisconsin offers Teaching Safe Bicycling every April to train bicycle safety trainers who organize on-bicycle instruction events such as rodeos. Basic traffic skills and information about causes of child crashes and developmental limitations are offered at these events.
- Adult courses developed by League of American Bicyclist and Bicycle Federation of Wisconsin are also available.

Strategy - Injury Control – Helmet Use

Head injuries are the leading cause of death and serious injury in bicyclists. Studies performed by the Safe Kids Coalition and Harborview Medical Research Center have determined that a correctly fitted and regularly worn helmet can prevent up to 85% of these serious injuries and many less serious head and facial injuries.

Bicycle skill instruction without helmet promotion fails to recognize that almost every bicyclist will be in at least one serious crash over a lifetime of riding, whether or not skilled and/or trained. A head injury in that single crash can lead to death or permanent disability which could have been prevented by a helmet. Helmet promotion should not be restricted to children. Although they have more crashes in the learning years, children's heads are no more at risk in a crash than are adult heads. A fall from only 2 feet can cause brain injury. On the other hand, helmet promotion alone will not prevent crashes, and bicyclists sustain some level of injury in nearly every crash.

Inexpensive helmets can be acquired individually or for large group distribution. Peer pressure has much to do with helmet use, and equipping a whole school or neighborhood and applying adult

expectation for children as well as other adults to wear their helmet is more effective than simply parental rules or legal mandates.

Strategy – Enforcement

Quality enforcement can reduce up to 90% of bicycle-motor vehicle crashes. Law enforcement officers can educate youngsters, adult bicyclists and motorists at traffic stops about ways to keep bicyclists safe. Officer activities range from assisting at instructional events to giving citations for the most serious violations. For motorists these include speed, operating under the influence, failure to yield (especially on turns), and intentional aggressive activity toward a bicyclist. For bicyclists, these include stoplight and sign violations, wrong-way riding, dart-outs and swerves in traffic, and night riding without lights. Wisconsin offers Enforcement for Bicycle Safety, an officer training course that develops officers' skills and their recognition of violations by both bicyclist and motorists that make bicycle travel dangerous.

Strategy – Evaluation

Observation of current practices can help determine the focus of other strategies. For example, while a large number of helmet promotion, sales or give-away projects have occurred over the past few years, we do not know whether they have resulted in any significant increase in consistent correct helmet use by target groups. If the target activity was aimed at elementary school-age children, we do not know whether other groups such as parents or adult or young bicyclists were affected in any way. Observational studies of helmet use, common bicycling errors, conflicts and the types of bicyclist involved will provide some much-needed rigor.

B. Criteria For Project Selection

Priority for bicycle safety funding will be give to communities with: (1) populations in excess of 10,000, (2) unusual exposure factors for bicycle crashes, (2) at least three years of data demonstrating a bicycle crash problem, (3) a high-level of community buy-in demonstrated by Project Match, (4) a plan for coordinated activity employing multiple actors, strategies, and/or fund sources, (5) an evaluation plan, (6) demonstrating good self-sufficiency within 1-3 years, and (6) a history of using Highway Safety funds effectively.

Communities with functioning Safe Community Coalitions that have used data to select bicycle safety as a priority area for community activity will be given preference.

Smaller communities may be eligible for start-up grants if they demonstrate problems of unusual scope or unusual community buy-in, plus unusual effectiveness in past Highway Safety Projects.

Communities may have funding for same activities for no more than 3 years, including both planning and implementation phases. Each year's activity will be evaluated, and communities that have not performed the prior year's contract will not be eligible for additional years of funding.

School Bus Safety

A. MAGNITUDE and SEVERITY of the SCHOOL BUS INJURY PROBLEM

This issue has received more attention than the extremely few crashes, injuries and deaths

warrant. Few school bus crashes result in serious injury, except those that involve pedestrians or motorists in other vehicles. School bus passengers are four times more likely to be killed as pedestrians near the bus than as passengers while on the bus.

Table 09-10 -- SCHOOL BUS CRASHES 1994-1996; 1999-2002											
SCHOOL BUS	1994	1995	1996	1997	1998	1999	2000	2001	94—96	00—02	
									2002	3-yr av	3-yr av
School Bus Crashes	1,126	1,117	945	771	771	838	835	800	638	1,063	758
Schl Bus Occ Fatalities	1	0	2	0	0	0	0	0	0	1	0
School Bus Occ Injuries	628	423	454	264	264	358	315	369	194	502	293
Schl Bus Occ A-Injuries	19	7	7	6	6	2	4	4	4	11	4
Total K + A	20	7	9	6	6	2	4	4	4	12	4

Source: WisDOT Crash Database

Motorists who pass a school bus while stopped with red alternating lights flashing can be cited by LEA if seen by officer or if bus driver gets license number. Often bus driver has no time to see and record this number while main job is getting child on/off bus safely. The Wisconsin Legislature passed a law requiring buses to have gates preventing children from being run over by the bus, but these gates will not address the more frequent cause of school bus-related injuries to children; that is, violations by passing motorists.

Most often injured in school-bus-related crashes are the drivers and occupants of the other vehicle. Children boarding/deboarding the bus are injured in lower numbers, but are double-counted as pedestrians in Wisconsin.

Occupant protection is a hotly contested issue, even though so few injuries occur on the school bus. The physical dissimilarities of the children within one age group create extreme difficulty in fitting protection individually. Occupants on the bus have little risk of serious injury, even in a crash, except in rare instances, such as when a semi is the other vehicle.

IV. STRATEGIES FOR DECREASING DEATHS & INJURIES in SCHOOL BUS CRASHES

Education – Public Information Materials

These materials are targeted at motorists, educating them about the provisions of school bus safety laws, emphasizing the stop requirement for all lanes on undivided highways when a school bus is stopped with red lights flashing.

V. ACTIVITIES and ESTIMATED FUNDING, by STRATEGY

STRATEGY -- ADMINISTRATION

Activity: WISCONSIN PEDESTRIAN and BICYCLE SAFETY PROGRAM MANAGEMENT State Approp. 461

Problem: State-funded Pedestrian and Bicycle Safety Program requires full-time administrator. Program created in 1984. Coordination with FHWA funded Bicycle facilities planner and program.

Objective: To coordinate and manage the State Pedestrian and Bicycle Safety Program & other state-level safety activity.

Resources: \$60,000 for 1.0 FTE wage, fringe, DP, training, M&S.

Self-sufficiency: This is a statutorily directed and funded position.

Evaluation: Administrative evaluation of level of activity and output.

STRATEGY -- EDUCATION –Public Information and Education

Activity: 04-09-01-PS PI&E – PEDESTRIAN AND BICYCLE SAFETY

Problem: Pedestrian and Bicycle Safety audiences and need for information vary by age and role. Materials must be targeted for a wide variety of audiences and must be revised frequently to address changing social and environmental factors.

Objective:

1. Maintain current materials to meet demand, evaluate validity and effectiveness, need for new or updated materials, develop new materials as required
2. Address target audiences - children under 15, elderly adults, alcohol-impaired travelers, and motorists sharing the road with them – with appropriate messages in appropriate formats.
3. Increase motorist and parental awareness of special problems of school zones and school buses.
4. Develop new youth-oriented materials.

Resources: \$ 80,000 for reprints and purchases.

Self-sufficiency: Approximately \$27,500 state-funded level of effort. Internet offers possibility of decreased cost of development/ handling of paper.

Evaluation: Administrative. Baseline survey required, then post-use survey of change in KAB

Activity: PI&E – PEDESTRIAN AND BICYCLE SAFETY - State Approp. 461

Problem: Pedestrian and Bicycle Safety audiences and need for information vary by age and role. Materials must be targeted for a wide variety of audiences and must be revised frequently to address changing social and environmental factors.

Objective: Maintain current materials to meet demand, evaluate validity and effectiveness, need for new or updated materials, develop new materials as required

1. To address target audiences - children under 15, elderly adults, alcohol-impaired travelers, and motorists sharing the road with them – with appropriate messages in appropriate formats.
2. To increase motorist and parental awareness of special problems of school zones and school buses.
3. To provide information about bicycle laws in Wisconsin to the public.

Resources: \$32,500. \$27,500 for reprints, purchases, evaluation and new materials; \$5,000 for bike law printing..

Self-sufficiency: State funding – possible increase in program size. Internet offers possibility of decreased costs.

Evaluation: Administrative. Baseline survey required, then post-use survey of change in KAB

STRATEGY -- EDUCATION – Training

Activity: 04-09-02-PS TRAIN the TRAINER, TEACHING SAFE BICYCLING and BASICS OF BICYCLING (BOB)

Problem: Certain unsafe behaviors by bicyclists and by motorists contribute to the vast majority of bicycle - motor vehicle crashes. **Teaching Safe Bicycling (TSB)** developed by Wisconsin DOT, Bureau of Transportation Safety Bicycle/Pedestrian Safety Program in consultation with City of Madison DOT, UW-Madison Agriculture Extension, and the Wisconsin Department of Health and Family Services addresses these behaviors.

Basics of Bicycling (BOB) provided by BOTS-arranged instructors. On school district commitment and instructor availability, two day course may be offered if minimum of 15 potential BOB instructors are available. This instructor training is not required for BOB acquisition & implementation. This or TSB is recommended for basic instructor preparation. School must host and arrange for lunch and breaks, classroom and riding space indoors as well as outdoors

Objectives:

1. To provide 3-4 annual TSB instructor workshops for teaching safe bicycling skills to children Required pre-registration, bicycle riding and helmet use. Carries 6.75 DOJ credit hours for LE officers and 8.0 DPI credit hours for teachers.
2. to provide BOB instructor training to 40 educators and assist them in implementing BOB as standard part of school or other educational program activities.

Resources: \$5,000. \$4,000 for TSB instructors, travel, materials/supplies, meals for participants. \$ 1,000 for BOB instructors, travel, materials/supplies.

Self-sufficiency: Most of this training is for trainers who take what they have learned (KAB) back into their communities. Continuous need for new trainers, and for technology updates.

Evaluation: Reviews of products, instructors, materials. Outcome evaluation statewide and in communities where training has been implemented over a period of years.

Activity: 04-09-02-PS OFFICER TRAINING -- ENFORCEMENT FOR BICYCLE and PEDESTRIAN SAFETY

Problem: Certain unsafe behaviors by bicyclists, pedestrians and motorists contribute to the vast majority of their crashes. Bicycles are not perceived as equal users of the road by themselves and others and the laws protecting pedestrians are routinely ignored. Enforcement for Bicycle Safety –EBS is a 2-day course for enforcement officers about the laws governing pedestrians and bicycles on roadways and the best strategies for enforcing them. Trained officers contribute to increased community perception of the rights and responsibilities of these roadway users. Officers must ride as part of instruction and wear helmet. Manual is included in course and available for review. Course fee is reimbursable by DOJ and carries 12 in-service credit hours.

Objectives:

1. Improve marketing of EBS course and prepare/support adequate instructors for traffic law enforcement officers.
2. Organize Bicycle Law Enforcement Summit for traffic (both bicycle mounted and MV)/ community policing/problem oriented policing/ LEA Safety/, and school liaison officers.
3. To reach the WI Court System with information about EBS.
4. To incorporate Pedestrian Law Enforcement in the EBS course or develop a WI-specific stand-alone course.

Resources: \$15,000. \$10,000 for updated EBS Manual update & printing, and EBS presentations to DA's and judges - consultant fees, travel, meals, lodging, M&S, printing, postage; \$5,000 for UW development of Pedestrian Law Enforcement course.

Self-sufficiency: Attendees can seek reimbursement from Department of Justice for in-service credit.

Evaluation: Reviews of products, instructors, materials, LEA acceptance and utilization. Outcome evaluation statewide and in communities where training has been implemented over a period of years.

STRATEGY -- EMPOWERMENT

Activity: 04-09-04-PS BIKE/PEDESTRIAN COMMUNITY PROJECTS.

Problem: Combinations of safety strategies at the local level are key to pedestrian and bicycling safety. Pedestrian and bicycle issues are an excellent means of motivating the formation of Safe Communities coalitions, and priority for funds can be ascertained using both crash and Safe Communities data. The best way to begin interdisciplinary cooperation can be in production of small, popular events featuring safety of children. Bicycle rodeos, Walk Our Children to School, and other such community events provide a feeling of accomplishment in those participating and prepare them for Safe Communities activities. Emphasis on Bike or Pedestrian enforcement in training both motivates and educates traffic officers to prevent these crash types. NOTE: Funds not distributed to the communities for these programs may be used for Safe Communities projects, and especially, safety-conscious planning and safety scanning projects for multi-modal improvements.

Objectives:

1. To encourage systematic approach to pedestrian, bicycle and other safety problems and to encourage collaborative multi-disciplinary planning and production of small safety-oriented events. Can be combined with occupant protection and youth alcohol activities.
2. To assist 20 communities in producing local bicycle safety events for 1500 children ages 7 to 14.
3. To integrate helmet promotions into community bike safety activities, and all injury prevention efforts.
4. To support implementation of Basics of Bicycling in another 5 school districts/communities.
5. To support 8 communities in organizing and implementing Pedestrian Road Shows using WI-trained facilitators. Can be combined with Safe Communities/Planning Projects.
6. To assist 8 communities to improve child travel choices and community involvement in best routes to school. Can be combined with Safe Communities/Planning projects.
7. To integrate Community Roadway Hazard ID program for Bicycles into local public works departments.
8. To assist up to 20 communities to increase quality enforcement for bicycle and pedestrian safety.

Resources: \$121,200.

\$20,000 grants of up to \$2,000 for Pedestrian Road Shows - for part time coordination, facilitator fees and expenses, participant snacks/lunches, materials and supplies and may include hardware or software if needed to manage pedestrian planning. 1-year funding.

\$10,000 for grants of up to \$1,000 to 10 communities for BOB Curriculum – bicycles, helmets, video equipment, instructional supplies. In some cases may include trailer or storage where multiple school sites/districts involved. 1-yr funding.

\$27,200 for grants of up to \$1,000 to 10-30 communities for on-bicycle instruction events; M&S. No bicycles may be purchased with this activity - see BOB for on-going instruction. Up to 3-year funding.

\$50,000 for grants of up to \$5,000 to 10-30 communities for ped/ bike/mixed law enforcement. Up to 3-yr funding.

\$24,000 for grants of up to \$6,000 to 6-10 communities for comprehensive Safe Routes to School Planning. 1- yr funding.

Self-sufficiency: One-time funding for Pedestrian Road Shows; community then develops its own project(s) to implement its own recommendations. Can include a second year of funding to attend PRS summit with others who held PRS. Small grant amount is easy to replace locally.

Evaluation: Number of communities generating short- and long-term safety recommendations. Compare Road-show communities pedestrian crash experience with control communities; compare crash experience of BOB-

trained students with control. Number of children, parents, volunteers who successfully complete planned activities. Number of agencies and education/enforcement stops of bicyclists, pedestrians and motorists. BOTS will aggregate community data to determine outcome effectiveness.

STRATEGY -- EVALUATION – Surveys and Studies

Activity: 04-09-05-PS PEDESTRIAN AND VEHICLE BEHAVIORS – FAILURE TO YIELD STUDY

Problem: A number of Pedestrian - Motor Vehicle crashes occur due to one or both of the parties failing to yield.

Objective: Conduct a study to better understand the pedestrian and driver behaviors and motivations to Fail To Yield.

Resources: \$10,000 for contract for consultant, printing, publication.

Self-sufficiency: Need for future surveys will be determined by the use of this first one. Protocol will be made available to communities for local surveys.

Evaluation: Administrative evaluation of survey process. Evaluation of statistical significance of samples of differing sizes, probative value of analyses, possibilities for data linkages, for example to law enforcement activity, etc.

Activity: 04-09-05-PS OBSERVATIONAL SURVEY – BICYCLIST BEHAVIORS AND HELMET USE

Problem: Current level of helmet use or of correct use appears to vary widely from community to community in Wisconsin, but no empirical data are available. Similarly, bicyclist (and motorist) compliance with laws and safe practice varies and has not been measured. These data are necessary for bicycle safety program development and evaluation.

Objective:

1. Select a consultant to assist program staff in the design and implementation of the survey and analysis of survey data. Use findings of survey and analysis in the planning of future bicycle safety plans at state and local levels, in development of safety messages. Distribute findings widely.
2. To record and encourage better use of data at state and local levels.
3. To encourage systematic approach to pedestrian and bicycle safety problems.

Resources: \$10,000 for contract for consultant, printing, publication.

Self-sufficiency: Additional surveys as needed. Protocol will be made available to communities for local surveys.

Evaluation: Survey process, statistical significance of samples of differing sizes, probative value of analyses.